

**REDESCRIPTION OF *PLATYNUS PROGATHUS* VAN DYKE
(COLEOPTERA: CARABIDAE: PLATYNINI) AND
CIRCUMSCRIPTION OF LINDROTH'S *DECENTIS* AND
HYPOLITHOS GROUPS**

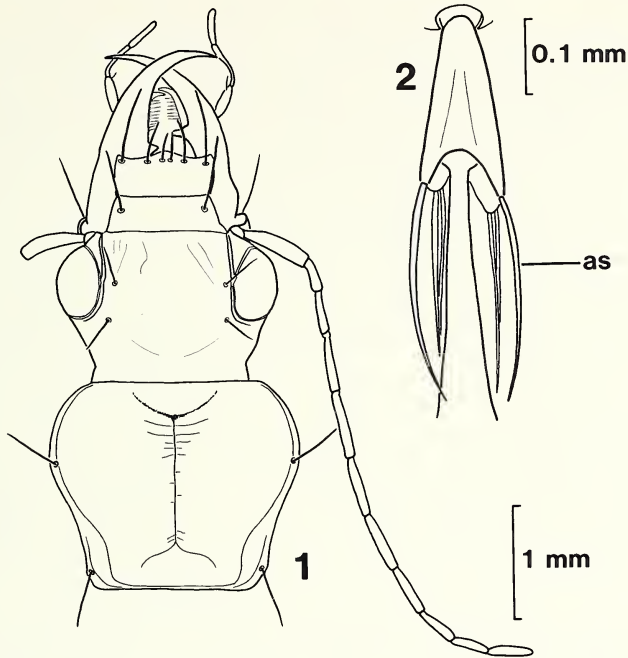
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Abstract.—*Platynus prognathus* Van Dyke is redescribed and reinstated in *Platynus* Bonelli. Shared-derived characters indicate that it is most closely related to other North American species of a redefined *hypolithos* group; *P. hypolithos* (Say), *P. angustatus* Dejean, *P. cincticollis* (Say), and *P. mannerheimii* (Dejean). The American *hypolithos* group can be diagnosed by spermathecal configuration, and the species are consubgeneric with the European *Batenus* Motschulsky (= *Platynidius* Casey NEW SYNONYMY). The American *decentis* group members share a fundamentally different spermathecal configuration that is also present in *Platynus assimilis* (Paykull), the type species of *Platynus sensu stricto* (= *Limodromus* Motschulsky). This spermathecal configuration is also present in other Neotropical lineages of the genus.

In 1926, Van Dyke described *Platynus prognathus* from a single specimen collected at St. Simon's Island, Georgia. Csiki (1931) transferred *P. prognathus* to *Agonum* Bonelli *sensu stricto*, while considering *Platynus* Bonelli another subgenus of *Agonum*. Erwin et al. (1977) retained the species in *Agonum* while elevating *Platynus* to generic rank. In this paper I redescribe the species, including external adult characters currently used to distinguish among genera of platynine Carabidae. Based on shared-derived characters, the species is reinstated in *Platynus*, and is considered a member of a redefined *hypolithos* group. Lindroth's (1966) key to North American species of the *hypolithos* and *decentis* groups is modified to facilitate identification of *P. prognathus*.

The *hypolithos* and *decentis* groups of Lindroth (1966) are realigned based on their different spermathecal configurations. Based on spermathecal configuration, European species in the subgenus *Batenus* Motschulsky (type species *Harpalus livens* Gyllenhal) are consubgeneric with species of the American *hypolithos* group. Several other Old World *Platynus* are classified as *Batenus* based on possession of this shared-derived, and highly unique spermathecal configuration. Based on spermathecal configuration, *Platynidius* Casey is considered a junior synonym of *Batenus*. The other large piceous *Platynus* species in America north of Mexico belong to the *decentis* group. These species exhibit a fundamentally different configuration of female reproductive tract also present in *Platynus assimilis* (Paykull) (= *Carabus angusticollis* F.), the type species of *Platynus sensu stricto* (= *Limodromus* Motschulsky). Other Mexican and Neotropical lineages of *Platynus* studied to date also possess the spermathecal configuration present in *Platynus* s.s.



Figs. 1–2. *Platynus prognathus* Van Dyke. 1. Head and pronotum, dorsal view. Left antenna omitted beyond scape. Apical setae and fine setae of antennomeres omitted. 2. Fourth metatarsomere of right hindleg, dorsal view. as = apical seta.

Platynus prognathus Van Dyke

Diagnosis. Distinguishable from all other North American *Platynus* by the elongate sickle-shaped mandibles (Fig. 1), narrow cordate pronotum with rounded basal angles, and narrow, elongate, parallel-sided and weakly convex elytra.

Description. **HEAD.** Eyes convex, protruding beyond outlines of postocular area; frons convex, ocular grooves broad, slightly wrinkled, extending broadly to posterior clypeal margin; labrum weakly bisinuate; mandibles elongate, with narrowly acuminate apices and strong retinacular teeth, tooth on the right mandible anterad that on left (Fig. 1); antennal segments filiform, basal 3 antennomeres glabrous except for apical setae, apical 8 antennomeres with apical ring of setae and covered with fine setae; constriction of neck shallow but visible in side view; mentum with well-developed acuminate median tooth, depressions on mentum broad and deep, lacking a central pit. **PROTHORAX.** Pronotum with rounded basal angles, a minute jag in lateral margin at posterior seta (Fig. 1); laterobasal depressions impunctate, margin laterad depressions narrowly reflexed at hind angles; basal marginal bead weak but evident across pronotal base; disc relatively convex, median longitudinal impression fine, traversed by irregular wrinkles; anterior transverse depression deep medially, delimiting a shiny median anterior callosity; anterior marginal bead and front angles lacking; lateral margin very narrow in front of anterior setae; prosternal projection

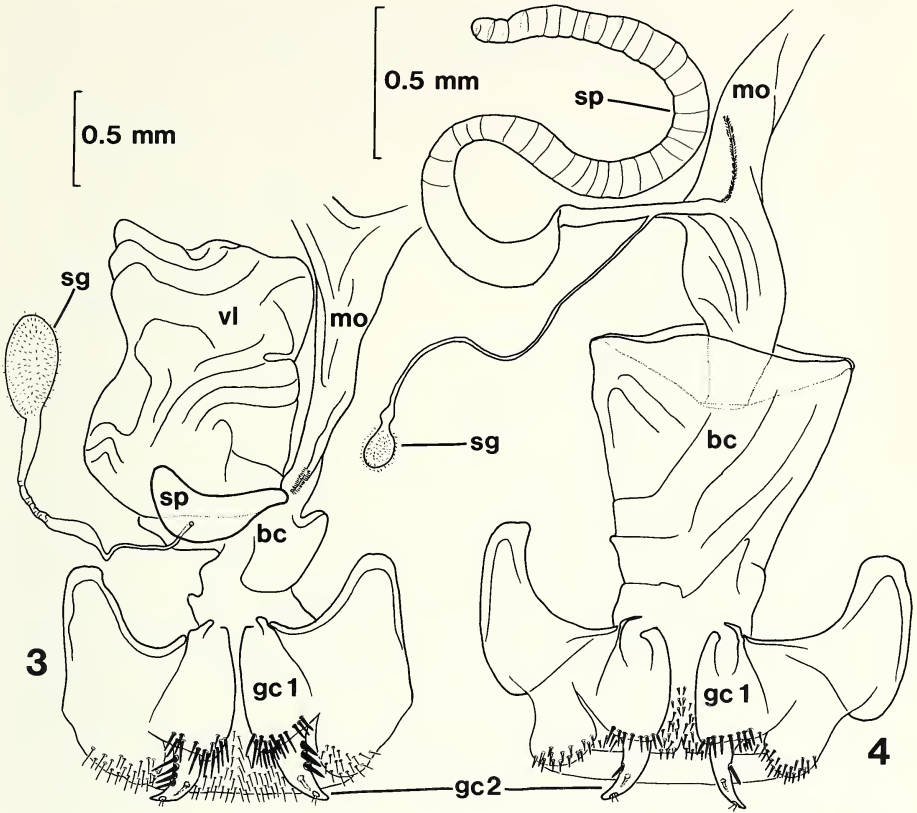
weakly depressed medially, unmarginated. ELYTRA. Humeri narrow, sides sub-parallel for much of length, each elytron about $3.9 \times$ as long as wide; basal groove weak, slightly angulate between sixth and seventh striae; lateral margin narrow in front, slightly wider from basal $\frac{1}{3}$ to subapical sinuation; apex beyond sinuation narrowly rounded; elytral striae complete, impunctate though slightly wavering; elytral intervals weakly convex; basal seta set between base of scutellar and first striae; 3 or 4 dorsal elytral setae, the anterior in stria 3 at basal $\frac{1}{6}$, the others in stria 2; a single seta in seventh stria mesad subapical sinuation; lateral series of 13 setae (5 or 6 anterior, 1 or 2 medial, 6 posterior). PTEROTHORAX. Metepisternum elongate, length along lateral edge $2 \times$ maximum perpendicular width; flight wing brachypterous, $0.4 \times$ length of elytron, with reduced venation and no reflexed apex. LEGS moderately elongate, tarsi stout, lacking internal or external dorsal sulci; fourth tarsomere with inner and outer apical setae, but no subapical setae (Fig. 2); apical tarsomere with very short ventral setae, not visible except at high magnification ($125 \times$); fourth tarsomere on middle and hind legs slightly asymmetrical, outer apical lobe longer and broader than inner lobe (Fig. 2); foretibia with weak anterior and posterior longitudinal sulci; mesocoxa bisetose, 1 ventral seta and 1 seta on mesocoxal ridge; mesofemur with 3 anteroventral setae; metacoxa bisetose; metafemur with 2 anteroventral setae. COLOR. Head capsule brunneous; labrum and mandibles rufous; palps and basal $3\frac{1}{2}$ antennomeres testaceous, apex of fourth antennomere and apical 7 antennomeres darker due to rufopiceous cast; elytral disc brunneous; lateral margin testaceous; venter rufous; coxae rufotestaceous; femora, tibiae and tarsi testaceous. MICROSCULPTURE. Frons and vertex with isodiametric microsculpture, slightly stretched transversely on neck; pronotal disc with transverse mesh microsculpture, mesh more isodiametric in anterior transverse depression; elytral intervals with well-developed isodiametric mesh, the cells regularly aligned transversely. LENGTH. 10.9 mm (male). *Holotype*. Male (C.A.S. No. 1861); GA: St. Simon Island, 22 Apr–12 May 1911, J. C. Bradley; Van Dyke Collection.

Notes. Van Dyke incorrectly sexed the holotype as a female. The front tarsi are dirty, but the squamose male adhesive setae can be seen on several tarsomeres. Moreover, the apical abdominal sternite bears 2 apical setae indicating that the specimen is a male. The holotype is somewhat teneral and was not dissected.

Fattig (1949) reported collecting *P. prognathus* from Dalton, Georgia, in July. This material was apparently destroyed before the Fattig collection was deposited at the University of Georgia (C. Smith, pers. comm.)

PHYLOGENETIC PLACEMENT AND CLASSIFICATION OF *PLATYNUS*

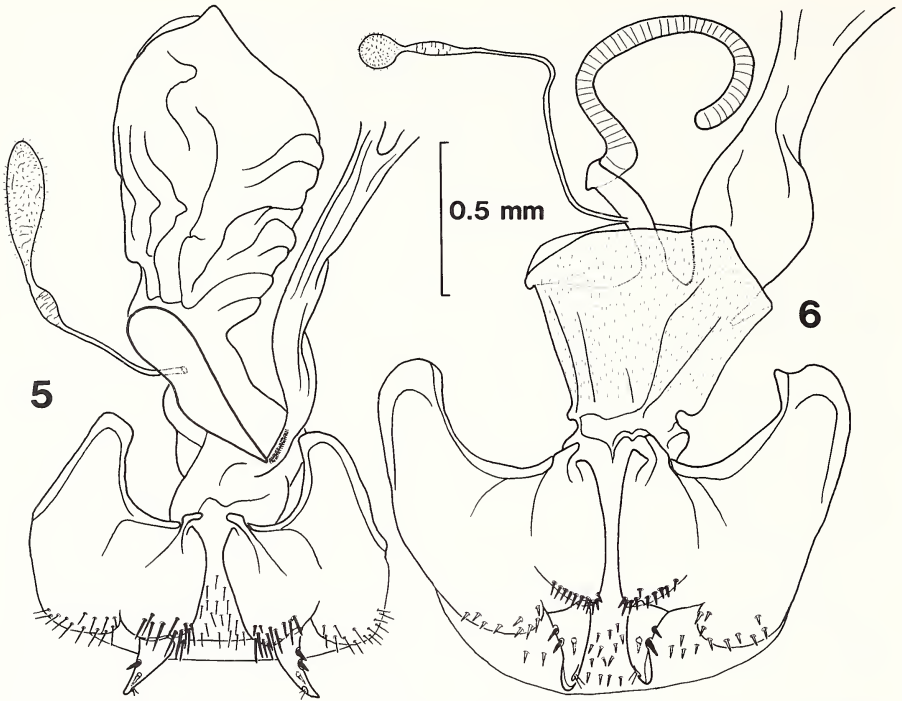
Within Platynini, *P. prognathus* can be characterized as a *Platynus* based on the constricted neck, median mentum tooth, glabrous basal 3 antennomeres, unmarginated pronotal projection, externally sulcate foretibia, and smooth claws. If the genus *Agonum* is considered the sister to *Platynus* (Liebherr, 1986), and the subtribe Sphodri is considered the sister group to the subtribe Platyni (Liebherr, 1986; Casale, 1988), a constricted neck can be considered a shared-derived character of *Platynus* species. Various clades within *Platynus* have lost the constricted neck (e.g., the *Platynus ovatulus* group [Liebherr, 1988]), but this appears to be correlated with smaller body size.



Figs. 3–4. Female reproductive track of *Platynus* species, ventral view. 3. *P. hypolithos* (Say). 4. *P. decentis* (Say). bc = bursa copulatrix; gc1 = basal gonocoxite; gc2 = apical gonocoxite; mo = median oviduct; sg = spermathecal gland; sp = spermatheca; vl = ventral lobe of bursa.

Within North American *Platynus*, *P. prognathus* shares rounded pronotal basal angles, a derived state, with *P. mannerheimii*, *P. angustatus*, and *P. hypolithos*. The latter 3 species plus *P. cincticollis* (Say) share a very distinctive spermathecal configuration, in which the spermatheca is sclerotized and appressed to the surface of the bursa copulatrix (Fig. 3). The spermathecal gland enters the dorsal surface of the sclerotized spermatheca. The bursa has a greatly expanded ventral lobe, several times as long as the spermatheca.

P. prognathus shares flattened elytra with *P. angustatus* and *P. hypolithos*. The brachypterous wings of *P. prognathus* are more reduced than the full wings of *P. cincticollis* or the slightly reduced wings of *P. mannerheimii*, but longer than the vestigial wings of *P. hypolithos* and *P. angustatus*. Metepisternal development and wing configuration are correlated, with elongate metepisterna present in *P. cincticollis*, *P. mannerheimii*, and *P. prognathus*, and quadrate metepisterna in the other two



Figs. 5-6. Female reproductive tract of *Platynus* species, ventral view. 5. *P. livens* (Gyllenhal). 6. *P. assimilis* (Paykull). Scale bar applicable to both figures.

species. Thus, based on external characters, *P. prognathus* is the sister species to the sister pair *P. angustatus* and *P. hypolithos*.

The spermathecal configuration observed in *P. hypolithos* and allies also occurs in the European *P. livens* Gyllenhal (Fig. 5) (Schuler, 1963). *P. livens* is the type species of the *Platynus* subgenus *Batenus* Motschulsky 1864. *P. hypolithos* was assigned the type species of the genus *Platynidius* Casey 1920 by Lindroth (1966). Based on spermathecal configuration, *Batenus* and *Platynidius* represent the same phyletic line, and *Platynidius* should be considered a junior synonym of *Batenus*.

The other large piceous *Platynus* from America north of Mexico are members of the *decentis* group, females of which exhibit a tubular spermatheca with a basally entering duct (Fig. 4). Other New World *Platynus* investigated to date uniformly exhibit similar tubular spermathecae (e.g., Liebherr, 1987, 1989).

The spermathecal configuration of the *decentis* group species is shared with *Platynus assimilis* (Paykull) (Fig. 6), the type species of *Platynus* Bonelli 1810 (= *Limodromus* Motschulsky 1864). Based on spermathecal configuration, the *decentis* group species are members of the same phyletic line comprising European *Platynus* s.s.

Jeannel (1942) used *Platynidius* for generic placement of American species allied to *P. hypolithos*, as well as any vestigially-winged European "*Platynus*." Macropterous

Table 1. Classification of *Platynus prognathus* plus other species of *Platynus* treated by Lindroth (1966) along with flight-wing configuration; +/+, macropterous and most likely functional flight wings; +/-, flight wings present but reduced, flight not recorded; -/-, flight wings vestigial.

<i>decentis</i> group	<i>hypolithos</i> group
<i>trifoveolatus</i> Beutenmüller (-/-)	<i>hypolithos</i> Say (-/-)
<i>ovipennis</i> Mannerheim (-/-)	<i>angustatus</i> Dejean (-/-)
<i>decentis</i> Say (+/-)	<i>prognathus</i> Van Dyke (+/-)
<i>brunneomarginatus</i> Mannerheim (+/+)	<i>mannerheimii</i> Dejean (+/-)
<i>opaculus</i> LeConte (+/+)	<i>cincticollis</i> Say (+/+)
<i>parmarginatus</i> Hamilton (+/+)	<i>pecki</i> group
<i>tenuicollis</i> LeConte (+/+)	<i>agilis</i> LeConte (-/-)
	<i>pecki</i> Barr (-/-)

species were classified separately in the genus *Agonum*, subgenus *Platynus*. Wing reduction occurs in many lineages of Carabidae (den Boer et al., 1980), and the morphological changes correlated with wing loss cause convergence on particular syndromes of body shape in distantly related clades (Casale, 1988:106–107). In *Platynus*, wing loss in a number of taxa is correlated with what can be termed a rhadiniiform body shape, i.e., rounded humeri, flattened elytra, widened apical half of the elytra, and lengthened head and legs. Such changes are predictable based on wing configuration. The differences in reproductive tract configuration outlined above, however, are more complex and have not been observed repeatedly in different groups. They involve the shape of the spermatheca, its level of sclerotization, the position of the spermathecal gland duct entrance to the spermatheca, and the presence or absence of a large ventral lobe of the bursa situated basal to the spermatheca. Moreover, the uniqueness within the Platynini and the high level of similarity for the spermathecal configuration observed in the American *hypolithos* group species and European species such as *P. livens* (Figs. 3, 5), supports its status as a synapomorphy for these taxa.

Based on a limited survey of Old World species, *Platynus praedator* Andrewes, *P. scrobiculatus* F., and *P. willbergi* Reitter share the appressed spermathecal configuration of *P. livens*. *P. praedator* possesses fully-developed flight wings, whereas the other two species are vestigially-winged. Clearly, other Old World species should be studied to determine the distribution of the two fundamentally different reproductive tract configurations.

For the North American fauna, Lindroth's (1966) *hypolithos* and *decentis* species groups can be realigned based on spermathecal condition (Table 1). Placement of *P. prognathus* in the *hypolithos* group is based on derived states of external characters shared with *P. hypolithos* and *P. angustatus*. These characters include pronotal shape, brachyptery, and flattened elytra. It is acknowledged that description of the female reproductive tract will be necessary to confirm this placement. When this classification is adopted, it is apparent that flight wing condition is not correlated with either species group.

Lindroth (1966) includes the Californian *P. agilis* LeConte in the *hypolithos* group. This species is much smaller and more pallid than species in the *hypolithos* group, and has a tubular spermatheca not unlike that of *decentis* group species. It is cladistically similar to *P. (Microplatynus) pecki* Barr (1982), plus other undescribed Mexican species. It is hereby removed from the *decentis* group and is considered a member of the *pecki* group (=s.g. *Microplatynus*).

IDENTIFICATION OF *P. PROGNAETHUS*

Because *Platynus* is currently recognized as a genus distinct from *Agonum* (Whitehead, 1973; Liebherr, 1986), Lindroth's (1966) key and classification must be modified. Within Lindroth's monograph, species 64-70 of his *Agonum*, plus other species on pp. 641, 645 and 646, should be considered *Platynus*.

In order to distinguish *P. prognathus* from other *Platynus* treated by Lindroth (1966:559-560), the following modification can be inserted at couplet 32. Figure numbers with an asterisk refer to Lindroth (1966).

32. Prothorax with completely disappeared hind angles (Figs. 1, 321a*) 32a
 - Hind angles of prothorax at least suggested (Figs. 321b-f*) 33
 32a. Mandibles elongate, sickle-shaped (Fig. 1). Elytra narrow, parallel-sided, apex narrow with well-developed subapical sinuation. Legs testaceous, body brunnescens *P. prognathus*
 - Mandibles broad to near apex, the acuminate tip short. Elytra broadest at apical 2/3 of length, apex broadly rounded, subapical sinuation weak. Legs and body concolorous, rufopiceous *P. mannerheimii*

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